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Bakker, F.C.; van Wieringen, P.C.W.

published in

Stress and anxiety (Volume 9).

1985

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Bakker, F. C., & van Wieringen, P. C. W. (1985). Anxiety induced by ego- and physical threat. In C. D. Spielberger, I. G. Sarason, & P. B. Defares (Eds.), *Stress and anxiety (Volume 9)*. (pp. 141-146). Hemisphere.

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Anxiety Induced by Ego- and Physical Threat

Preliminary Validation of a Dutch Adaptation of Spielberger's State-Trait Anxiety Inventory for Children (STAIC)

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*In C.D. Spielberger, I.G. Sarason, & P.B. Denjares (Eds.)
Stress and anxiety (Vol. 9) (pp. 141-146). New York:
Hemisphere. INTRODUCTION*

The present study was designed to validate a Dutch adaptation of the State-Trait Anxiety Inventory for Children (STAIC) (Spielberger, Edwards, Lushene, Montouri, & Platzek, 1973). The STAIC consists of two 20-item scales for measuring state and trait anxiety. State anxiety (A-State) refers to the emotional reactions that are evoked in individuals who interpret specific situations as personally threatening. These reactions are characterized by "feelings of tension and apprehension, and by heightened autonomic nervous system activity" (Spielberger, 1972, pp. 30-31).

Trait anxiety (A-Trait) refers to relatively stable individual differences in anxiety proneness. Persons who are high in A-Trait are more disposed, "... to perceive a wide range of stimulus situations as dangerous or threatening, and to respond to such threats with A-State reactions" (Spielberger, 1972, p. 39). Spielberger's (1966, 1972, 1977) theory of anxiety assumes that the level of A-State is determined by the interaction of trait anxiety and situational characteristics. According to Endler, Magnusson, Ekehammar, and Okada (1976) and Spielberger (1966, 1977), trait-anxiety scales are especially suited for the prediction of state anxiety in ego-threatening circumstances.

In order to obtain information on the reliability and validity of a newly developed Dutch adaptation of the STAIC, this scale was administered in several different situations. The Dutch STAIC A-Trait and A-State scales were given in two neutral situations, and the A-State scale was also administered during ego-threat and physically threatening situations. This procedure permitted the computation of test-retest correlations under neutral conditions and trait-state correlations under two types of stress conditions. Trait anxiety was also assessed by two existing Dutch tests, Wilde's (1967) ABV-K and Hermans' (1969) PMT-K, which were administered to evaluate the concurrent validity of the STAIC.

METHOD

The subjects were 55 male pupils from two Dutch primary schools. They were 11 or 12 years old at the time they participated in the study. It was not possible for all of the children to be present during all four testing situations. Therefore, the computations are based on different subsamples of the total group.

The children completed the following three questionnaires: (a) The Dutch adaptation of Spielberger et al.'s (1973) State-Trait Anxiety Inventory for Children, which was developed by the authors in cooperation with two Anglists; (b) A Dutch test for debilitating fear of failure, viz. the F⁻ scale of Hermans' (1969) PMT-K; and (c) A Dutch test for neuroticism, viz. the N scale of Wilde's (1967) ABV-K.

The children were tested under four different conditions. In the first testing session ("Neutral 1"), the children were given the STAIC State and Trait Anxiety scales, the F⁻ scale of the PMT-K, and the N scale of the ABV-K in this order in their own classroom. The STAIC was readministered in the same locality, four weeks later ("Neutral 2").

During the third testing session ("Jump"), which occurred two weeks after the second session, the State Anxiety scale was administered just before the subjects had to jump from a 3-meter diving board into a swimming pool. This requirement was meant to pose a physical threat to the children, who were asked to report if they had previously jumped either more or less than five times before they participated in the present experiment. Of the 55 subjects, 48 participated in this condition.

The fourth testing session took place one week after the third session. The State Anxiety scale was administered to the 41 subjects who participated in this condition just before starting a written "school test paper." This condition was intended to be a threat to the students' self-esteem (ego-threat).

RESULTS

Reliability of the STAIC

The test-retest reliability for the Dutch STAIC A-Trait scale obtained over a four-week period in the two neutral conditions was 0.71 ($n = 54$). This coefficient was of the same order of magnitude as the test-retest stability coefficients reported by Spielberger et al. (1973), viz. 0.65, the latter being based on a group of 132 boys and a test-retest interval of six weeks.

The homogeneity indices (alpha coefficients) for the A-Trait and A-State scales in the "Neutral" conditions are reported in Table 1, along with the alpha coefficients obtained by Spielberger et al. (1973). It may be concluded that the test-

Table 1 Alpha-coefficients for the STAIC A-Trait and A-State scales in neutral conditions

	Neutral 1	Neutral 2	Spielberger ^a
Trait	0.80	0.81	0.78
State	0.74	0.74	0.82

^aReported by Spielberger et al. (1973).

Table 2 Means and standard deviations for the STAIC A-State scores in four testing situations and for the A-Trait scores in two neutral conditions

	A-State		A-Trait	
	Mean	SD	Mean	SD
Neutral 1	29.2	3.07	30.7	5.56
Neutral 2	28.9	2.95	29.9	5.19
"Exam"	31.5	4.34		
"Jump"	29.8	5.85		

retest reliability and the homogeneity of the Dutch A-Trait scale was very close to the values reported for the English Form by Spielberger et al. in the STAIC Test Manual.

The test-retest correlation for the Dutch STAIC A-State scale in the neutral conditions was 0.54 ($n = 54$) as compared to a test-retest correlation of 0.31 reported by Spielberger et al. (1973). Since A-State scores are expected to fluctuate from situation to situation, test-retest correlations are not useful as a reliability index; the alpha coefficient is more suited for this purpose. The alpha coefficients for the A-State scales during "Neutral 1," "Neutral 2," "Jump," and "Exam" were 0.74, 0.74, 0.87, and 0.92, respectively. During "Neutral 2," items 2 and 11 were non-discriminating: therefore, for this condition, computation of alpha was based on 18 of the 20 items. Spielberger et al. (1973) report an alpha of 0.82 for a neutral condition. The finding of greater homogeneity (higher alphas) for A-State in threatening situations as compared with neutral situations was also reported by Spielberger et al. (1970) for the STAI. It may be concluded that the reliability indices for both the A-Trait and A-State scale are acceptable and similar in magnitude to those reported by Spielberger et al. (1973).

Validity of the STAIC

Evidence for the construct validity of the STAIC A-State scale may be derived from comparisons of the scores obtained in the stressful and non-stressful situations of the present study. Means and standard deviations for the A-State and A-Trait scores in the two neutral conditions, the "Exam" condition and the "Jump" condition are reported in Table 2.

A one-way analysis of variance of the data for the A-State scale indicated that the differences between the means were statistically significant ($F = 3.52$, $df = 3/194$, $p < 0.05$). A Student Newman-Keuls post hoc analysis demonstrated that the A-State scores during the "Exam" condition were significantly higher ($p < 0.05$) than during the two neutral conditions. There were no significant differences, however, between the A-State means for the "Jump" condition and the neutral conditions.

In the "Jump" condition, it is important to distinguish between subjects with more experience (five or more jumps from the diving board) and those with less experience (fewer than five jumps). It might be expected that less experienced subjects ($n = 26$) would be higher in A-State in the "Jump" condition than the more experienced subjects ($n = 22$). This expectation was supported by the finding that the

A-State mean of 31.7 for the less experienced subjects in the "Jump" condition was significantly higher than the mean of 27.6 for the more experienced subjects in this condition ($t = 2.53$, $df = 46$, $p < 0.01$). The mean A-Trait scores for the experienced and inexperienced subjects were 31.5 and 30.2 in the Neutral 1 condition, and 30.4 and 29.2 in Neutral 2. Thus, the differences in the A-State scores cannot be attributed to differences in A-Trait.

Correlations between scores on the A-Trait scale, the F^- scale and the N scale that provide evidence of the concurrent validity of the Dutch STAIC are reported in Table 3. The correlations between the A-Trait and Neuroticism scales were approximately the same as the test-retest reliability of the A-Trait scale. The moderately high correlations between these scales and the comparability of item-content suggest that both scales measure the same construct. Although the correlations between A-Trait and F^- are somewhat lower, these correlations are of the same magnitude as those reported by Sarason et al. (1960) between a general trait anxiety measure and debilitating anxiety, and somewhat higher than the relationships reported by Hermans (1971).

Correlations between STAIC A-State scores and scores on the A-Trait, N, and F^- scales for the 35 children who participated in all four experimental conditions are reported in Table 4. The following conclusions may be drawn from these correlations:

1. The A-State scores were positively correlated with the A-Trait, N, and F^- scores.
2. In the "Exam" condition, the strongest relationship was between A-State and F^- ($r = 0.42$). This finding was compatible with Hermans' (1971) interpretation of high F^- scores as reflecting anxiety reactions in typical test situations.
3. The correlations between the A-State and A-Trait scores in the "Exam" condition were lower than in the Neutral conditions. A similar result was published by Spielberger et al. (1970) without interpretation. These findings are contrary to Spielberger's (1972, 1977) and Endler et al.'s (1976) hypothesis that A-Trait scales are especially suited for predicting anxiety reactions in ego-threatening situations.

As previously noted, the mean A-State score for inexperienced subjects in the "Jump" condition was significantly higher than for the experienced subjects, suggesting that only the inexperienced subjects showed increased anxiety. For the "Jump" condition, correlates between the A-State scores and scores on the A-Trait, N, and F^- scales for the experienced and inexperienced subjects are reported in Table 5, in which it can be noted that these correlations were only significant for the inexperienced subjects. These findings appear to contradict Spielberger et al.'s

Table 3 Correlations between the A-Trait scores the F^- scores and the Neuroticism scores for 54 children

	A-Trait (neutral 2)	N	F^-
A-Trait (neutral 1)	0.71***	0.72***	0.60***
A-Trait (neutral 2)		0.71***	0.59***
N			0.45***

*** $p < 0.001$.

Table 4 Correlations between STAIC A-State scores and A-Trait, F⁻ and N scores in the four testing situations

	Trait (neutral 1)	Trait (neutral 2)	F ⁻	N
A-State scores				
Neutral 1	0.53***	0.35*	0.13	0.43**
Neutral 2	0.31*	0.24	0.24	0.27
"Exam"	0.23	0.26	0.42**	0.16
"Jump"	0.20	0.37*	0.29	0.36*

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

(1970) hypothesis that changes in A-State evoked by threats of physical danger are unrelated to level of A-Trait. However, the results would be consistent with Spielberger's theory if the "Jump" situation constitutes a threat to self-esteem for the inexperienced subjects who are more likely to be afraid to jump and to feel shame and ridicule from their peers if they fail to jump.

DISCUSSION

The results concerning the reliability and construct validity of the preliminary Dutch adaptation of the STAIC are encouraging, especially when one takes note of the many problems that may arise when testing children by means of self-ratings. Not only are children inclined to respond in a socially desirable way (Sarason et al., 1960), but there is also the possibility that "the child's linguistic skills have not developed to a point where they could serve adequately in the role of observer of his own behavior" (Lang, 1976, p. 17).

The satisfying results of the present study notwithstanding, it would seem that changes in the preliminary form of the Dutch STAIC are necessary. First, the power of the A-State scale in discriminating between different situations seems rather weak and has to be improved. Secondly, in the "Neutral 2" condition, two of the A-State items did not discriminate and will have to be replaced by more sensitive items.

Interpreting the present findings in the framework of Spielberger's Trait-State Anxiety Theory leads to two difficulties: Whereas Spielberger predicts that A-Trait measures predict state anxiety in response to ego-threat and not to physical threat, the results of the present study show an opposite trend. This was especially true

Table 5 Correlations between STAIC A-State scores and A-Trait, F⁻ and N scores in the "Jump" condition, for the inexperienced ($n = 26$) and the experienced group ($n = 22$)

	Trait (neutral 1)	Trait (neutral 2)	F ⁻	N
A-State ("Jump")				
Inexperienced	0.36*	0.48**	0.40*	0.56***
Experienced	0.26	0.22	0.32	0.08

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

for subjects inexperienced in jumping from the diving board, who might therefore be expected to be more afraid than the experienced subjects. The correlations between A-Trait and A-State for these subjects were higher for the physically threatening "Jump" condition than for the "Exam" condition (see Tables 4 and 5). It might be argued, however, that that jump situation was ego-threatening ("shame" about one's fear) as well as a physical danger. A greater elevation in A-State would then be expected for the high A-Trait subjects and the results would be consistent with Spielberger's theory.

The second difficulty arises in connection with Spielberger's suggestion that A-Trait predicts the *intensity* of anxiety states in ego-threatening situations. Accordingly, higher correlations between trait and state anxiety scores would be expected for the "Exam" situation than for the Neutral situations, an expectation which was not confirmed by our data. It is perhaps worth noting that Spielberger himself presented results on adult subjects which are compatible with those in the present study, viz. correlations for males varying from 0.51 to 0.67 during neutral, and from 0.37 to 0.67 during threatening conditions, while the figures for women vary between 0.44 and 0.55, and 0.11 and 0.53, respectively (Spielberger et al., 1970).

While only very tentative conclusions can be based on results of a small validation study, these findings might have important implications for Spielberger's anxiety theory if future research bears them out. In this respect, we might note that it is not logically compelling to expect that *frequency* of anxiety experiences (as measured by A-Trait) should predict *intensity* of state anxiety in threatening situations.

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